SEKONIC STUDIO DELUXE II

OPERATING INSTRUCTIONS

model L-398M

SEKONIC

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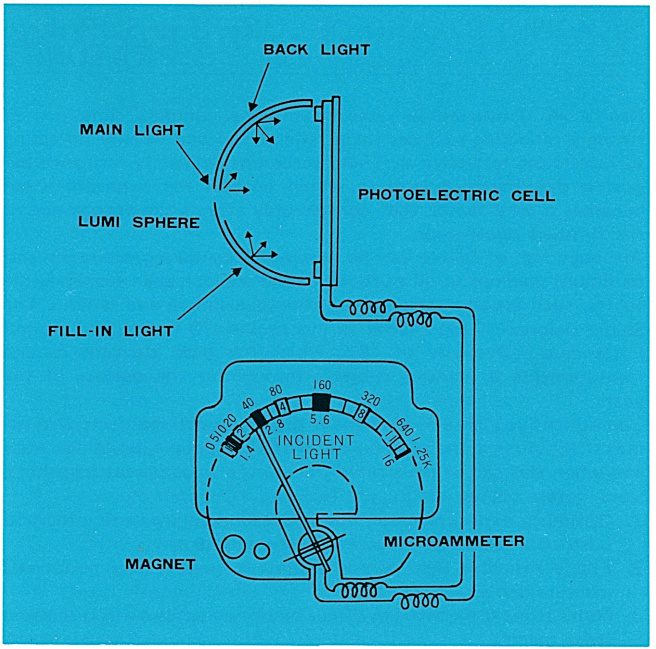
SEKONIC STUDIO DELUXE II L-398M FEATURES

Nearly all photographic subjects combine complex variations of strongly reflecting surfaces (high reflectivity) and weakly reflecting surfaces (low reflectivity). These variations delicately influence exposure determination and to which portion the exposure is set becomes a vital factor that considerably affects the appearance of the finished photograph.

Although risk of failure can be minimized by taking maximum and minimum readings of all portions of the subject, then averaging the values, such an approach is both time consuming and tedious. The Studio Delexe II is the answer to this problem. It is designed around a standard reflectivity of 18%, which has been derived through measurements of various subjects throughout the seasons of the year.

Consequently, high effectiveness is displayed with subjects possessing reflectivities in the neighborhood of 18% (people, buildings, etc.) and when this can be considered the average value (street snapshots, trees, forest scenes, etc.).

1. Optimum exposure meter for incident light measuringmethod (also applicable for reflected light method).
2. Freely rotatable light sensor section for very easily performed measurements.
3. Meter stopper mechanism allows operation while hand is released from meter.
4. Meter release mechanism is also included which allows the needle to deflect freely. This provides greater convenience when determining light balance.
5. Memo pointer enables easier light balance setting.
6. Lumisphere detects the same light as strikes the subject. Since subjects are normally 3-dimensional, according to the lighting conditions, brighter surfaces (highlights) and darker surfaces (shadows) are produced (illumination contrast). The Studio Deluxe II mechanism automatically takes into account the strength of light from all directions, causing the meter to indicate a value applicable to photography. It is thus most convenient for determining typical exposures.



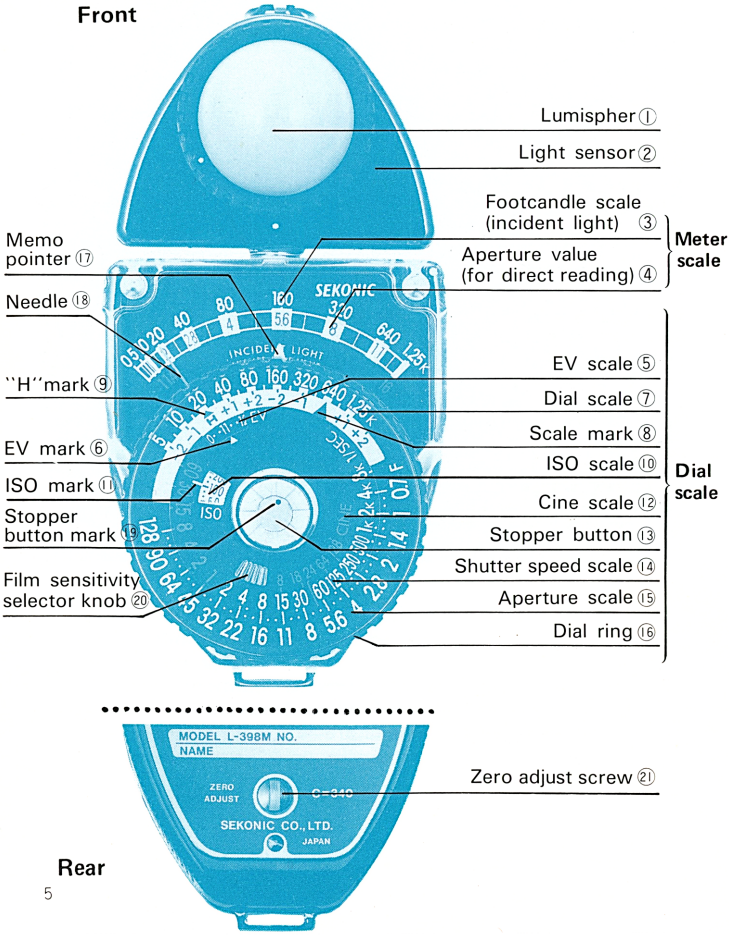
7. After combining film sensitivity and shutter speed, direct reading slides (optional) can be used for directly determining the aperture value.
8. Selenium photocell is employed as light sensing element, eliminating need for battery.
9. Wide selection of available accessories allows numerous photographic techniques to be enjoyed.

SPECIFICATIONS

Measuring System	Incident light (reflected light system also capable)
Measuring Range	At ISO 100, EV 4~17
Measuring Accuracy	Within ± 0.3 EV (1/3f stop)
ISO Scale	6 ~ 12000
Shutter Scale	60 ~ 1/8000 second
Aperture Scale	0.7~128
Cine Scale	8 fps ~ 128 fps
EV Scale	1 ~ 20 (exposure value)
Calibration Constant	C = 340 K = 12.5
Dimensions	112 × 58 × 34 mm
Weight	Approx. 190 grams

(NOTE) The outlooks and specifications described in this booklet shall be changed without pre-advice, if necessary.

PART DESIGNATIONS



ACCESSORIES

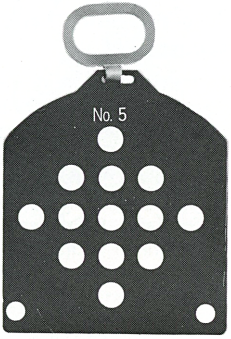
Lumisphere ①

Lumidisc ㉓

Lumigrid ㉔

High (H) slide ㉒

Optional Accessories
(sold separately).
Direct reading slides.



Total of 11 direct reading slides
(set of 11 slides in case).

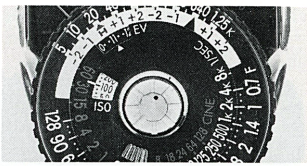
BASIC OPERATION OF METER UNIT

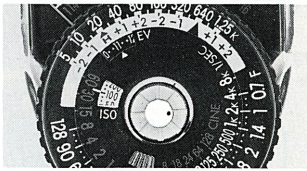
1. Stopper Button Operation

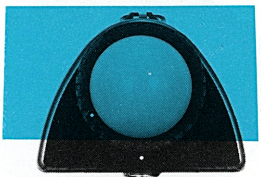
If the stopper button ⑬ is pressed when the stopper button mark ⑲ is set to ⊙, the meter needle ⑱ deflects according to brightness. Then when the button is released, the needle remains fixed at the indicated position.

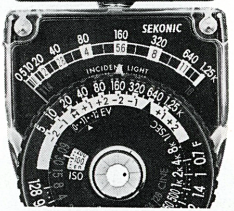
By holding the stopper button depressed and turning it clockwise so that the mark position becomes ○, the needle is released.

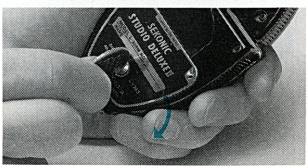
At this time, the meter will deflect freely even if the stopper button is released. To fix the needle, turn the stopper button counter-clockwise to where the mark is positioned ⊙











2. Zero Position Check and Adjustment

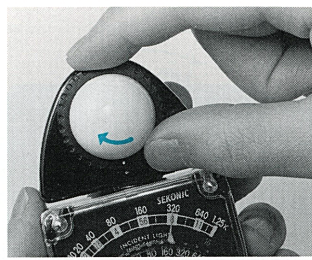
With stopper button in released ○ position, cover light sensor with hand or black cloth to completely block light. Check that meter needle ⑱ correctly indicates zero position. If the indication deviates from zero, while observing meter indication, use a coin or similar tool to turn the rear zero adjust screw ㉑ and adjust for zero indication.

STANDARD ACCESSORY OPERATION

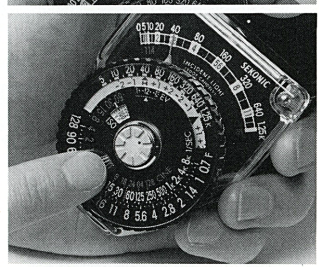
Incident Light Measurement

1. Lumisphere

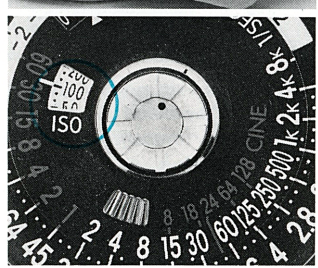
a. Mount Lumisphere ① to light sensor ② . To mount, align white dots of Lumisphere frame and light sensor, then turn Lumisphere carefully clockwise to secure.



b. Set film sensitivity knob ⑳ to sensitivity value of employed film. Set ISO value to right side ISO mark ⑪ .
Photo shows setting for ISO 100.

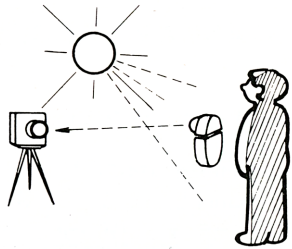


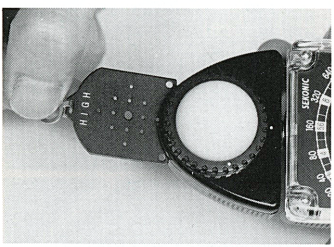
c. From position where subject is to be measured, point Lumisphere ① in direction of camera. (Light sensor ② can be turned freely.)

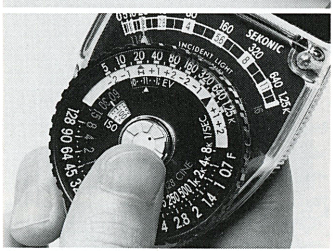


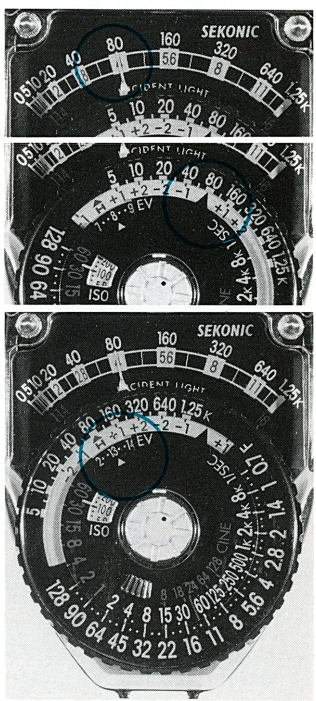
d. Hold meter erect and press stopper button ⑬ . Meter

needle ⑱ deflects according to brightness. When the stopper button is released, the meter needle becomes fixed at the deflected position. If the location is excessively bright and the meter needle deflects beyond scale, insert the High slide ㉒ .









e. Read the footcandle indication ③ of the meter needle.

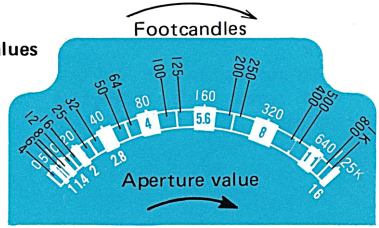
f. Transfer footcandle value to the dial scale ⑦ . Rotate the dial ring ⑯ and set the ▲ scale mark. If the High slide ㉒ has been inserted, set the ▲H mark.

g. At this time, the shutter speed scale ⑭ and aperture scale ⑮ combination becomes the correct exposure.

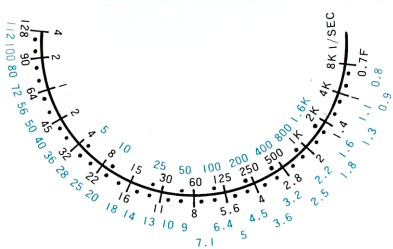
Example: With High slide inserted, meter indicates 80 footcandles. At ISO 100, the proper exposure becomes 1/250 sec at F/5.6, 1/30 sec at F/16 and 1 sec at F/90.

h. By changing ISO setting, the set combination of shutter speed and apertue scale is automatically altered to the appropriate one corresponding to the changed ISO value.

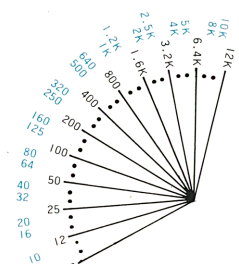
*** Meter scale intermediate values**



*** Intermediate values for shutter speed and aperture scale**



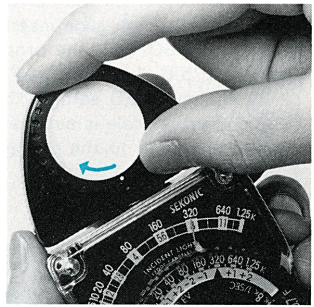
*** Film sensitivity intermediate values**



Note:
When no slide is inserted, strong light directly striking the slide slot may enter through the slot.
Although this does not seriously affect exposure, if more accurate exposure is required, cover slot with hand.

2. Lumidisc

Employ for illumination contrast adjustment and luminance measurement.



- Contrast measurement

a. Mount Lumidisc ㉓ to light sensor ② . Install in the same manner as Lumisphere.

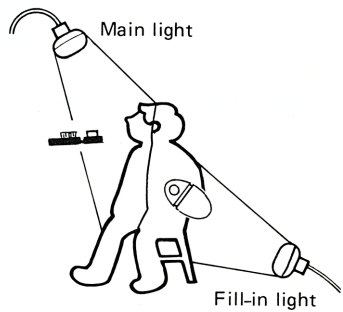
b. Hold meter at subject position and point Lumidisc ㉓ directly toward center of main light.

c. Press stopper button ⑬ and read meter scale footcandle indication ③ .

d. Turn the memo pointer dial and set the pointer 17 at the footcandle value the needle points to.

e. In the same manner, measure the fill-in light. In this case, use care that light from main source dose not enter sensor.

f. Read a difference between the footcandle value the pointer is set (see above c) and the one for fill-in light (= needle position).
Ratio between main and fill-in light footcandles becomes the contrast ratio.



Example: With main light at 640 footcandles, fill-in light reads 320 footcandles. Illumination contrast ratio becomes:

$$\frac{640}{320} = \frac{2}{1} \quad \text{or } 2:1$$

- Luminance (Lux) measurement

a. Mount Lumidisc ㉓ to light sensor ② in the same manner as Lumisphere.

b. Place Lumidisc ㉓ parallel with the measured surface.

c. Press stopper button ⑬ and read meter scale footcandle indication ③ .

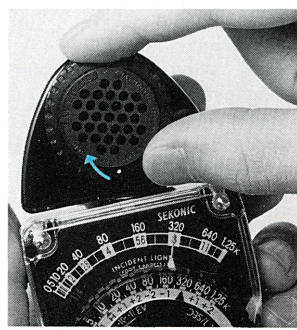
d. Multiply this value by 10.76 to obtain lux.

Example: 80 x 10.76 = 860.8 lux

If meter deflects beyond scale, insert High slide ㉒ , then multiply footcandle indication by 32.

Example: 80 x 32 = 2560 footcandles

2560 x 10.76 = 27545.6 lux



Reflected Light Measurement

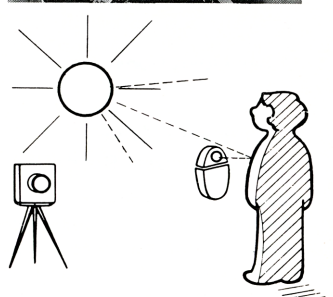
1. Lumigrid

a. Mount Lumigrid ㉔ to light sensor ② in the same manner as Lumisphere.

b. Set sensitivity value of employed film. Setting is performed in the same manner as for incident light measurement.

c. Point Lumigrid ㉔ directly toward part of subject to be measured.

d. As close as possible to the subject, measure reflected light from main point of subject. Use adequate care at this time that meter shadow etc. does not interfere.



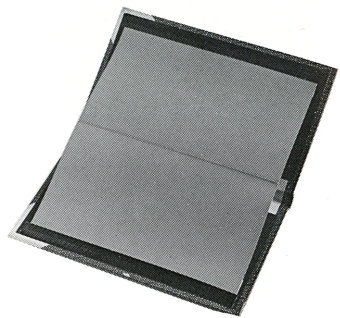
e. Press stopper button ⑬ and read meter scale footcandle indication ③ . However, since footcandles are units of incident light only, this value becomes simply a reference.

f. Transfer indicated value to dial scale ⑦. Rotate the dial ring ⑯ and set ⍈ mark ⑨.

g. At this time, shutter speed scale ⑭ and aperture scale ⑮ combination becomes the correct exposure.

Note: Do not employ slides for reflected light measurement.

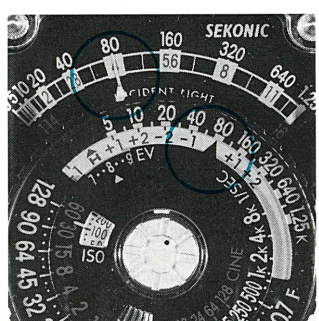
* More accurate results can be obtained for reflected light measurement by using a standard reflectance slide (optional accessory).



Other Operations

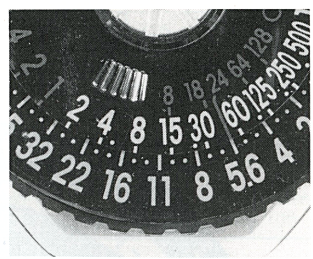
1. Exposure Value (EV number) Readout

Reading this exposure value to perform setting becomes convenient for cameras which employ a light value system shutter and aperture combination.



a. Read meter needle ⑱ foot-candle indication ③ .
b. Transfer this number to the dial scale ⑦ . Rotate dial ring ⑯ and set ▲ scale mark ⑧. If the High slide is inserted, set the ⛰ mark ⑨.
c. EV value indicated by EV mark ⑥ becomes the correct exposure value.

2. Employing Cine Scale



Incident and reflected light measurements during cine photography are performed in the same manner as described previously. However, since the cine scale ⑫ numerals correspond to cine camera film speed, read the aperture scale ⑮ indication that pertains to the employed film speed.

Note: Some cine cameras possess faster exposure times due to a narrower rotating shutter angle (angle of light transmitting portion). It is important to know the accurate film speed versus shutter angle value for your camera in order to determine proper exposure. Refer to the camera operating instructions, maker's catalogue, etc. for shutter speed information.

Shutter angle and exposure calculation:

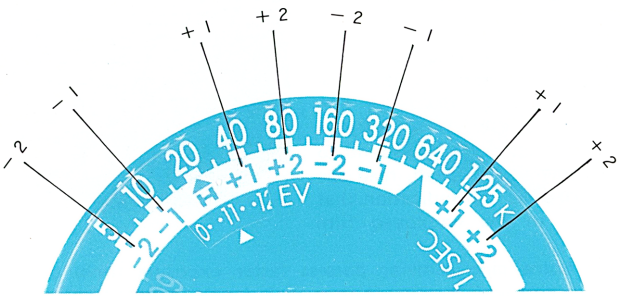
$$T = \frac{\theta}{360 \times R}$$

R = Frames exposed in 1 second
T = Exposure time
θ = Shutter angle

Note: Standard theatrical cine film speed is 24 fps at 1/50 sec. This position is indicated by a red line on the scale.

3. Using Exposure Multipliers (−2, −1, +1, +2)

Exposure multiplier indications are provided at both sides of the ⛗ and ▲ marks of the dial scale. Use the −1 or −2 mark when desiring to cut the exposure to 1/2 of 1/4 and +1 or +2 mark to multiply the exposure by 2 or 4.
Set the appropriate mark, instead of the or, to the dial scale value.



EMPLOYING SPECIAL ACCESSORIES

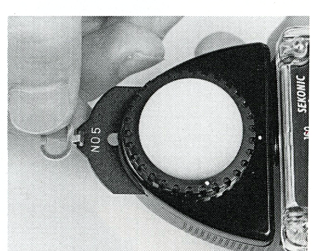
1. Direct Reading Slides

A total of 11 slides are available, all of which may be used together with the Lumisphere and Lumidisc. (Note that they cannot be used with Lumigrid.) The High slide, as mentioned previously, is employed for varying the measuring range in 2 steps (high and low illumination), however, it can also be used for direct reading. The other slides are specialized for direct reading and cannot be used for mode selection.

Shutter speed / Slide No.	1/15	1/30	1/40	1/50	1/60	1/125	1/250	1/500
1	ISO 64	ISO 125	ISO 160	ISO 200	ISO 250			
2	50	100	125	160	200	400		
3	40	80	100	125	160	320		
4	32	64	80	100	125	250		
5	25	50	64	80	100	200	400	
6	20	40	50	64	80	160	320	
7	16	32	40	50	64	125	250	
8		25	32	40	50	100	200	400
9		20	25	32	40	80	160	320
10		16	20	25	32	64	125	250
11			12	16	20	40	80	160
High					12	25	50	100

Note: One set of slides consists of slide numbers 1 ~ 11 in a case. The High slide can also be used as a direct reading slide.

2. Direct Reading Slide Application



When photographing, select slide from the above table according to film sensitivity and shutter speed. Insert slide and perform measurement in the same manner as for incident light. Read directly the aperture value ④ indicated by the meter needle ⑱ .

* Since it is not necessary to rotate the dial when employing direct reading slides, setting becomes extremely fast and convenient.

MEASUREMENT EXAMPLES WITH VARIOUS SUBJECTS

1. Portrait Photography

There are various kinds of human subject photography. In a case, for example, of a skier against a snowy mountain background, the human subject simply becomes a picture detail and for the purpose of determining the exposure, this cannot be considered portrait photography. In the final analysis, portrait photography is when the human subject is in the center of the picture and the exposure adjusted to him. In addition, camera to subject distance must be considered, whether the picture is to be one person or a group.

Measurement by incident light (Lumisphere installed) displays high effectiveness in portrait photography. Perform measurement as described in the section on Incident Light Measurement. After setting the proper exposure for the human subject, lighting conditions do not present a problem and subject detail is preserved even under back lighting.

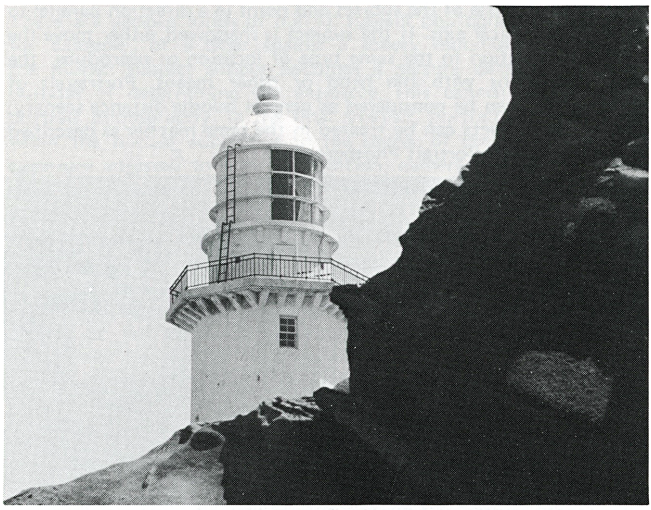
2. Typical Scenery

In the case of scenery, measure by using the Lumisphere at the camera position (refer to section on Incident Light Measurement). Although the previously described standard holding method is adequate, if lighting conditions of subject and camera positions are dissimilar, move the meter to a position where conditions are the same type as those of the subject and point in a direction parallel to the camera optical axis. If the subject is shadowed, either move the measuring position to the same type of location or reproduce the same conditions with the hand or other means. Portrayals of buildings etc. can be considered as general middle distance scenery, while main subjects can be treated in the same manner as described in the section on Portrait Photography.

3. Observatorial Scenes

This refers to the situation where a distant object in the subject field forms an important part of the pictured scene.
Examples: Observatories, distant views, etc.

Distant scenes are subject to haze due to atmospheric effects on light and can be easily overexposed. For this reason, first use the Lumisphere and measure by standard method from the camera position. Then point the Lumisphere toward the sun and measure. Determine exposure from the mean of the two obtained values.



Note: To obtain the mean of the two values, perform as follows.

- Transfer mean value of the two footcandle indications (aperture scale) to the dial.

Example: If 320(8) footcandles and 80(4) footcandles are obtained, the mean value becomes 160(5.6). In the case of 80(4) and 40(2.8) footcandles, the intermediate becomes the desired value. Consequently, transfer that value to the dial.

- Transfer each footcandle value to the dial to obtain exposure. In cases of the same aperture, setting the shutter speed to the average is acceptable.
- Memo pointer is useful for memorizing the first measured value.

4. Snow Scenes

a. Many cases of problems occur with reflected light measuring methods due to snow surface glare. Using incident light measurement eliminates these concerns. Freshly fallen snow possesses a reflectivity of approximately 73%, while even after several days in urban areas, this declines only to about 60%. Compensation must therefore be performed. Measurement by standard method is reduced by $1/\sqrt{2} \sim 1/2$.

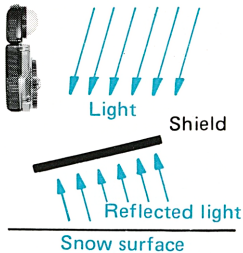
Example: If T becomes 1/125 at f 16:

$1/125 \times 1/\sqrt{2} = 1/177 \fallingdotseq 1/200$ or $1/125 \times 1/2 = 1/250$

Note 1: Reduce as much as possible since overexposed snow can take on a flour-like appearance without luster in the finished photograph.

Note:2: $1/\sqrt{2} \sim 1/2$ compensation amount is based on the reflectivity value of snow. This may vary according to snow quality and soiling.

Note 3:
In situations with direct or top lighting (sun near zenith), the Lumisphere will detect reflected light from the snow surface. Some means of blocking the light from below becomes required in this case.



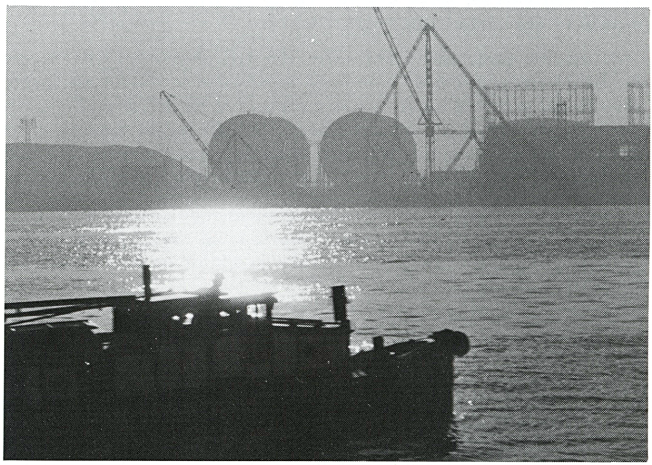
b. In some cases, good results can be obtained with reflected light measurement under back light conditions, cloudy snow scenes where glare is less and snow scenes under direct lighting. Install Lumigrid and point light sensor slightly downward to block light from the sky, then from camera position, aim toward subject and measure. Be sure to set the ⛰ mark at this time and do not employ slides.

5. Scenes with Side or Back Lighting

In typical cases of back and side lighting, although the surface of a 3-dimensional subject facing the camera becomes dark, a portion is usually strongly lighted. Even though standard measurement with the Lumisphere can bring out detail of the darker portions, on occasion, the brighter portions can become overexposed and difficult to see. In some instances, this effect can even be enhanced to produce a special photographic composition, but for a generally more attractive result, perform as follows. First use the Lumisphere and measure by standard method, then determine exposure from the mean value (same technique as used for Observatorial Scenes).

6. Silhouette Photography

In situations such as a silhouette of a person, tree or bridge in the foreground against the setting sun and brilliantly shining sky as background, remove slide and point Lumisphere toward the setting sun to measure (as with Reflected Light Measurement). Then without inserting High slide, set to ⛫ mark. In this manner, the foreground becomes silhouetted by underexposing the light source.



APPLICATIONS SUMMARY

1. Special Features of the Studio Deluxe II

As the Studio DeluxeII is a high precision measuring instrument, by fully utilizing its capabilities, its special functions can be displayed covering an additionally wide range of applications. Incident light measurement is an extremely practical method in actual photographic situations and is often employed by professional photographers and cinematographers. Since proper exposure can be determined even in cases where errors are easily incurred with reflected light measurement, it is extremely convenient for both color and monochrome.

The Lumisphere displays its optimum value when used for incident light measurement during color or monochrome photography of fleshtones (portrait photography in which fleshtones are considered as the main picture element for determining exposure). Since good or bad quality portrayals can be discerned even by amateurs, fleshtones become the only true standard in color photography. (They can also be given a wider range of artistic expression than visible to the naked eye.)

Well known basic principles form the foundation of the Studio DeluxeII, however, plenty of latitude is provided for obtaining special effects. By allowing variations in exposure to be performed, exactly the same reproductions become possible as those learned only from experience. Utilizing the selection of accessories also opens the way to the multitude of applications described in the preceding pages.

2. Illumination Contrast

Light balance measurements are the most important application of the Lumidisc. This consists of measuring the ratio of main light and fill in light in order to perform vital adjustments when photographing an illuminated subject. The photographer is advised to record the data obtained for his particular equipment. This will provide ready reference in the future and allow the same lighting conditions to be reproduced.

When shooting in a studio or similar situation where artificial lighting equipment is used, more attractive results can be produced by making the main and fill in light ratio 4 : 1 ~ 2 : 1. Also when using reflectors either indoors or outdoors, determine the exposure after measuring the illumination ratio.

Normal sunlight becomes the main light source outdoors, while white or silver reflectors are used to brighten shadow portions of the subject. In this situation, install the Lumidisc, point it toward the sun and read the indicated value. Turn the memo pointer dial and set the pointer 17 at the read value. Next, point the Lumidisc toward the reflector (shield with hand to avoid sunlight) and again read the indicated value. To obtain maximum color effect, this fill in light source should be 1/2 ~ 1/4 of the main light.

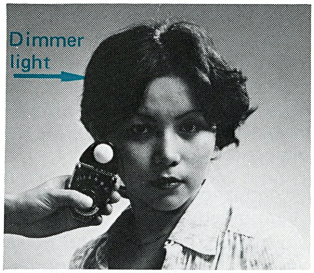
An additional theatrical effect can be produced with monochrome by using a higher illumination ratio. It is suggested, for example, to use a ratio between fill in light and sunlight of 1/16 or lower.

If the meter needle deflects beyond scale, use the H slide and as described earlier, multiply the indicated value by 32. Then calculate main and fill in lighting (see section on *Contrast measurement).

After completing light balance adjustment, replace Lumisphere and measure exposure by normal method. At this time, hold the Lumisphere close to the subject to fully detect sunlight and fill in light.

Main light measurement

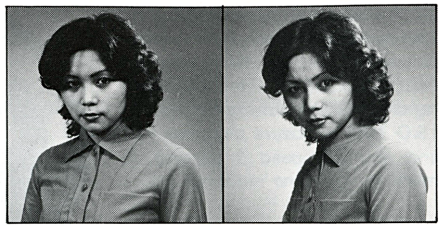
Fill in light measurement



Use white or silver reflector to brighten shadow portions of subject.

Exposure measurement

Illumination ratio can be varied by keeping the main light fixed and varying the fill in light.



1 : 1 2 : 1

4 : 1 8 : 1 16 : 1

3. Reflected Light Measurement

Reflected light measurement is employed for the following purposes.

a. Luminance range adjustment.
b. Self-lighted subjects such as neon signs which can only be measured by reflected light method and locations such as show windows where meter cannot be brought into proximity with subject to allow incident light method.

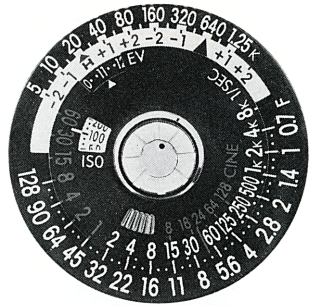
Measurement in these type situations in described below.

1. Luminance range center point

Refers to measuring subject luminance by reflected light method. This luminance varies somewhat according to incident light strength and surface reflectivity of the subject. Incident light becomes measured by taking the standard surface reflection as 18%, from which the exposure value is determined.

To obtain accurate exposures, the Lumisphere is used to measure effective footcandles to determine the Luminance center point.

Shown here is an example of using Lumisphere and by normal measuring method without slide, meter needle indicates 640 footcandles. With film sensitivity of ISO 100, exposure becomes f 45 and shutter speed 1 second. ⏃ mark at this time indicates 20.



This 20 indicates the exact center point of the luminance range. In the same condition, install Lumigrid and when standard reflectivity of 18% is measured, this means that the dial scale will indicate 20.

When determining exposure by using the Lumisphere or Lumidisc, the ⏃ mark will always indicate the center of luminance range, regardless of whether or not the High slide is inserted.

If the measured value is set to the dial scale ▲ mark and the ⏃ mark dose not reach the scale, reflected light measurement with the Lumigrid cannot be performed due to insufficient incident light strength. In other words, if the incident light is less than 160 footcandles, reflected light measurement cannot be performed with the Lumigrid.

2. Determining subject luminance range

a. Install Lumigrid in place of Lumisphere and remove any installed slide. Since the meter needle indicates relative luminance, employ Footcandle scale ③ value to compute the luminance ratio.

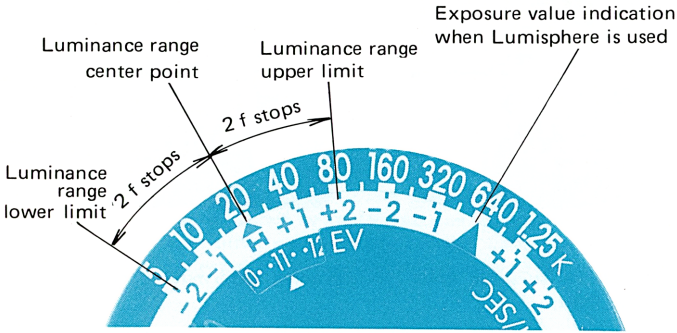
b. Hold meter about 15cm from the subject, point Lumigrid to each surface of the subject and read the footcandle scale value.
c. To determine the luminance range, it is sufficient to divide the highest meter indication by the lowest. For example, if the highest value is 80 and the lowest 5, the luminance range becomes 80/5 = 16/1 or 16 : 1.

Luminance range measurement

3. To obtain superior color photographs, determine upper and lower limits.

a. Adequate color photographs can be obtained with typical color film if within the subject luminance distribution, the maximum is less than 4 times the center point and minimum more than 1/4 times (i.e.: overall luminance range becomes less than 16 : 1).
b. With a luminance center point of 20, if the measured maximum luminance is higher than 80 (center point 20 x 4 = 80), color of that surface will become faded in the photograph. Consequently, a slight reduction of incident light to this portion becomes required.
c. Conversely, a portion with a measured minimum luminance less than 5 (center point 20 ÷ 4 = 5) requires increased illumination in order to obtain an acceptable color photograph.

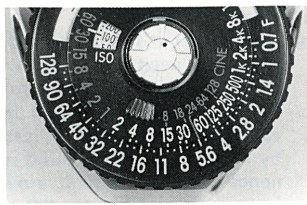
The Studio Deluxe indicates normal color photograph luminance range limits corresponding to 2 f stops left and right of the luminance range center point.


Exposure value indication when Lumisphere is used
Luminance range center point
Luminance range upper limit
2 f stops
2 f stops
Luminance range lower limit
10 20 40 80 160 320 640 1,25 K
+1 +2 -2 -1
0 -1 -2
0 -1/2 -1 EV
+1 +2
SEC

4. Illumination Adjustment

The Studio Deluxe possesses an array of functions for the performance of illumination adjustments which were nearly unknown in earlier instruments. It allows the shooting site to be set up quickly and accurately. Described here are set up procedure and

examples to provide full control over movie scenes. It would not be erroneous to also apply these to still photos.



Stage 1

Determine overall lighting strength.

a. Set meter to ISO 100 (see film sensitivity intermediate values).
b. Set 24 red line of cine speed scale to F/5.6.
c. At this time, ▲ mark indication on dial scale becomes slightly lower than 640 (footcandles). If this is taken as the meter scale position, a value of 500 footcandles (lower than 640 footcandles) becomes the required lighting strength (see meter intermediate scale values).

Stage 2

Key light setting

a. Turn on key light (main light) and determine direction required for subject illumination.
b. Without installing slide, hold meter at the subject position, point Lumisphere toward camera and set stopper button to released ○ position.
c. Adjust main light intensity or distance until meter indicates 400. The indication can then be increased to the required 500 footcandles (determined in Stage 1c) by applying fill in light.

Stage 3

Adjust illumination contrast

a. Install Lumidisc in place of Lumisphere.
b. Measure key light (indication should be 400 footcandles).
c. Turn on fill in light.
d. As described in section on outdoors Illumination Contrast Adjustment, adjust fill in light to obtain suitable illumination contrast. (For a contrast ratio of 2 : 1, the fill in light indication must be 200 footcandles.) Lighting from back affects contrast only slightly.

Stage 4

Adjust luminance range

a. Install Lumisphere.

b. Hold meter at subject position, point Lumisphere toward camera and read needle indication. With all lights turned on, adjust main light so that indication becomes 500 footcandles.

c. Set ▲ mark to 500 and read ⛫ mark indicated value. This value becomes 16 to indicate luminance range center point. If by experience the required results can be obtained with a luminance range of 16 to 1, a maximum luminance indication of 64 (center point 16 x 4 = 64) becomes the upper limit for desired color reproduction. In this case, the minimum limit becomes 4 (center point 16 ÷ 4 = 4). This means that attractive color reproduction cannot be obtained unless the subject luminance distribution is within 4 ~ 64.

d. Exchange Lumisphere for Lumigrid and check if there are any locations on the subject brighter than 64 or dimmer than 4.

Stage 5

Determine correct exposure

Although above Stage 4b includes an exposure value measurement using the Lumisphere, perform correct exposure measurement as a final check. With the illumination controlled as described, this should accurately become F/5.6 1/50 sec. This 5 stage procedure allows full control of all lighting elements.

5. Closeups

It is essential to increase the exposure value when the subject is closer to the camera than 10 times the camera focal distance. An example of this type of case is with a camera lens focal distance to 50mm and a subject distance of 40cm. The reason for this is the increased image magnification as the subject approaches the camera. When light from the subject passes through the lens and becomes focussed on the film, the following relationship exists among film plane illumination, subject brightness and image magnification.

$$E = \frac{a \cdot \pi L}{4 \cdot F^2} \cdot \frac{1}{(M+1)^2}$$

E: Film plane illumination
L: Subject luminance
M: Image magnification
F: F number
π: circular constant
a: constant

As can be noted from the above formula, if the subject luminance is fixed and the magnification changes, the film plane brightness (illumination) varies in the inverse proportion $(M + 1)^2$. With a large subject distance, M is small and this effect becomes nearly absent, but as the subject distance decreases, M becomes larger. In an actual photographic example, with a magnification M of 1, film plane brightness becomes $(M + 1)^2$ or 4. This is 1/4th that of a subject distance at infinity and exposure must be increased 4 times. When the measured exposure value is 1/60 sec shutter speed, this must be compensated to 1/15 sec (1/60 x 4 = 1/15). In closeup photography, $(M + 1)^2$ is referred to as the compensation factor.

Measuring Method

Hold meter as close as possible to the subject and point Lumisphere toward the camera. If light source is very close to the subject, temporarily remove the subject and hold the Lumisphere in the subject position. The light then striking the Lumisphere becomes exactly the same as that illuminating the subject. To obtain exposure compensation for closeup:

1. Determine exposure by normal incident light method.
2. Measure subject and image sizes (groundglass).
3. If the image is larger than the subject, it is enlarged, while a smaller image is compressed. Divide the larger value by the smaller value.
4. Obtain compensation factor from Table 1.
5. Apply compensation factor to measured exposure value to produce compensated exposure value.

Table 1 Closeup Exposure Compensation Table

Compensation factor = $(M + 1)^2$

Compression		Enlargement	
Subject to image ratio	Compensation factor	Subject to image ratio	Compensation factor
20 : 1	1.10	1 : 1	4
19 : 1	1.11	1 : 1.25	5
18 : 1	1.11	1 : 1.50	6
17 : 1	1.12	1 : 1.75	7.5
16 : 1	1.13	1 : 2	9
15 : 1	1.14	1 : 2.25	10.5
14 : 1	1.15	1 : 2.5	12
13 : 1	1.16	1 : 2.75	14
12 : 1	1.17	1 : 3	16
11 : 1	1.19	1 : 3.5	20
10 : 1	1.21	1 : 4	25
9 : 1	1.24	1 : 4.5	30
8 : 1	1.27	1 : 5	36
7 : 1	1.31	1 : 6	49
6 : 1	1.36	1 : 7	64
5 : 1	1.44	1 : 8	81
4.5 : 1	1.50	1 : 9	100
4 : 1	1.56	1 : 10	121
3.5 : 1	1.65	1 : 11	144
3 : 1	1.78	1 : 12	169
2.75 : 1	1.86	1 : 13	196
2.5 : 1	1.96	1 : 14	225
2.25 : 1	2.09	1 : 15	256
2 : 1	2.25	1 : 16	289
1.75 : 1	2.47	1 : 17	324
1.5 : 1	2.78	1 : 18	361
1.25 : 1	3.24	1 : 19	400
1 : 1	4.00	1 : 20	441

HANDLING CAUTIONS

Since the Studio DeluxeII is a high precision instrument, use ample care in regard to the following points.

- Avoid dropping or subjecting it to strong shock.
- Do not store in high temperature or high humidity locations.
- Do not store in areas subject to magnetic fields or where insect repellants are located (metal cabinets, clothing dressers, etc.).
- Keep Lumisphere and Lumidisc clean and protect from scratches. If severely soiled, these can be washed in a lukewarm solution of mild detergent. Rinse and dry thoroughly.

In event service is required, contact the nearest authorized service agency. If necessary to ship the meter, be sure to surround it with at least 3cm (1-1/2") thick insulating material and pack in a sturdy, crush resistant package.

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